

December 18, 2015

U.S. Nuclear Regulatory Commission  
11555 Rockville Pike  
Rockville, MD 20852-2738

Attn: Document Control Desk  
Director, Division of Spent Fuel Management,  
Office of Nuclear Material Safety and Safeguards

Subject: 10 CFR 71.95 Report for Instances Where the Conditions of Approval in the  
Certificate of Compliance Were Not Observed In Making a Shipment

Docket No. 71-9225, NAC-LWT Package

Dear Mr. Hsia:

71.95(c)(1) – Abstract:

On November 2, 2015 Canadian Nuclear Laboratories (CNL) informed NAC of an issue with a caddy assembly in the CNL rod bay pool. During the loading operation in the CNL rod bay pool, the caddy assembly bottom plate to tube weld failed after an NRX fuel element was lowered and released into the caddy assembly. The fuel element was lowered until it was approximately 6 - 8 inches above the caddy assembly bottom. It was then released to drop the remaining distance so it would be fully seated in the bottom of the caddy assembly. At the instant of contact, the fuel element broke loose the bottom plate of the caddy assembly and fell to the fuel pool floor. This weld joint failure is reportable under 10 CFR 71.95(a)(3) because two shipments of NRX fuel in similar caddies were completed with conditions of approval in the Certificate of Compliance (CoC) were not observed in making a shipment. Specifically, license drawing 315-40-175, Revision 1 which calls out this weld and the weld inspection acceptance criteria (Note 1) for this weld joint.

Columbia Hi Tech (CHT) constructed the caddy assemblies and has entered this issue into their corrective action program as CAR-15-052. Upon investigation it has been determined by CHT that two of the welders used to construct the caddy assemblies were not qualified for the specific caddy assembly bottom plate to tube weld joint configuration. Thus, the acceptance criteria identified in Note 1 to license drawing 315-40-175, Revision 1 was not met. Not meeting this criteria results in not meeting the condition of approval listed in the CoC where the caddy assembly is to be constructed in accordance with the license drawing. Additionally, this issue has been entered into the NAC corrective action program as SIR-15-011. Future NRX fuel shipments have been suspended until all caddy assemblies are brought into compliance with the CoC and/or new caddy assemblies are constructed in accordance with the license drawing requirements.

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71.95(c)(2) Description:

Caddy Assembly, NRU/NRX

License Drawing: 315-40-175, Rev. 1, Caddy Assembly, NRU/NRX (Attachment 1)

Background:

The NAC International Legal Weight Truck (NAC-LWT) spent fuel shipping cask is approved by the NRC for the transport of various radioactive materials. The NAC-LWT cask assembly is composed of a package that provides a containment vessel preventing the release of radioactive material. The cask is designed and certified to transport numerous fissile and radioactive contents, as described in the Certificate of Compliance (CoC) 71-9225. Depending on the contents, the configurations may require spacers, baskets, basket inserts, canisters, caddy assemblies, etc., to support and/or control the content geometry during transport. Authorized NAC-LWT contents include NRU and NRX fuel. Due to the increased reactivity of NRX fuel, a caddy assembly is used to provide a radial geometry constraint that restricts fuel rod movement. The NRX assemblies or loose NRX fuel rods are placed into the caddy assembly, which in turn is placed into a NRU/NRX fuel basket tube inside the NAC-LWT.

Requirement:

The caddy assembly bill of materials Item No. 2, Bottom Plate, is to be welded to Item No. 1, Tube, with a 1/16 bevel groove weld except for the slot openings (see Zone E1 of Drawing 315-40-175, Rev. 1). The welds were to be visual inspected (VT) per ASME Section V, Articles 1 and 9 with acceptance criteria per Section III, NG-5360 (Drawing 315-40-175, Rev. 1, Note 1).

Reportable Condition:

On November 2, 2015 CNL informed NAC of an issue with a caddy assembly in the CNL rod bay pool. During the loading operation in the CNL rod bay pool, the caddy assembly bottom plate to tube weld failed after an NRX fuel element was lowered and released into the caddy assembly. The fuel element was lowered until it was approximately 6 - 8 inches above the caddy assembly bottom. It was then released to drop the remaining distance so it would be fully seated in the bottom of the caddy assembly. At the instant of contact, the fuel element broke loose the bottom plate of the caddy assembly and fell to the fuel pool floor. This weld joint failure is reportable under 10 CFR 71.95(a)(3) because two shipments of NRX fuel in similar caddies were completed with conditions of approval in the Certificate of Compliance (CoC) were not observed in making a shipment. Specifically, license drawing 315-40-175, Revision 1 calls out this weld and the weld inspection acceptance criteria (Note 1).

Columbia Hi Tech (CHT) constructed the caddy assemblies and has entered this issue into their corrective action program as CAR-15-052. Upon investigation it has been determined by CHT that

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two of the qualified welders used to construct the caddy assemblies were not qualified for the specific caddy assembly bottom plate to tube weld joint configuration. Thus, the acceptance criteria identified in Note 1 to license drawing 315-40-175, Revision 1 was not met. Not meeting this criteria results in not meeting the condition of approval listed in the CoC where the caddy assembly is to be constructed in accordance with the license drawing.

Impact on Operability:

While the two NRX fuel shipments were completed without any loading incidents, future NRX fuel shipments have been suspended until all caddy assemblies are brought into compliance with the CoC and/or new caddy assemblies are constructed in accordance with the license drawing requirements.

Extent of Condition:

There has been only one caddy assembly known to have failed during loading operations, however, subsequent visual inspections found two others with observed weld cracks. CHT entered this issue into their corrective action program as CAR-15-052. Upon investigation it has been determined by CHT two of the qualified welders used to construct the caddy assemblies were outside of their qualified range when performing the welds in question.

NAC has entered this into our corrective action program as SIR-15-011. Future NRX fuel shipments have been suspended until all caddy assemblies are brought into compliance with the CoC and/or new caddy assemblies are constructed in accordance with the license drawing requirements. Since the bottom plate is not relied on for criticality safety, if a weld failure were to occur during shipment it would not have an impact on the effectiveness of the NAC-LWT packaging.

71.95 (c)(3) Assessment of Safety Consequences and Implications:

The caddy assembly tube provides the radial geometry constraint relied upon for criticality safety and not the bottom plate. The tubes ability to constrain the geometry of the NRX fuel would be unaffected by a failure of the bottom plate to tube weld. Thus, a failure of this weld joint is not necessary for criticality safety. The NRX fuel rods are placed into the caddy assembly which in turn is placed into a NRU/NRX fuel basket. The NRU/NRX fuel basket is then placed inside the NAC-LWT for shipment.

71.95(c)(4) Corrective Actions:

In addition to CHT having documented the condition in CAR 15-052, NAC has documented the condition in a SIR-15-011, in accordance with our Quality Assurance Program, to address the condition described herein. Future NRX fuel shipments have been suspended until all caddy assemblies are brought into compliance with the CoC and/or new caddy assemblies are constructed in accordance with the license drawing requirements.

71.95(c)(5) Previous Similar Events:

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There have been no previous similar events with the shipment of NRX fuel.

71.95(c)(6) Contact:

Mr. Wren Fowler  
Director, Licensing  
Phone: 678-328-1236  
Email: [wfowler@nacintl.com](mailto:wfowler@nacintl.com)

71.95(c)(7) Radiological Consequences:

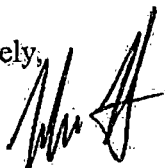
The condition described herein did not cause any additional exposure of individuals to radiation or to radioactive materials.

Conclusion:

This is reportable under 10 CFR 71.95(a)(3) because conditions of approval in the certificate of compliance were not observed in making a shipment. Specifically, the caddy assembly bottom plate to tube welds were not completed in accordance with the license drawing requirement per Note 1 on license drawing 315-40-175, Rev. 1. This noncompliance with the CoC is not safety significant because the bottom plate is not relied on for criticality safety and would not have an impact on the effectiveness of the NAC-LWT packaging even if it failed during a shipment.

Should the Commission require further details regarding the condition described herein, please contact me.

Sincerely,



Mr. Wren Fowler  
Director, Licensing  
Engineering

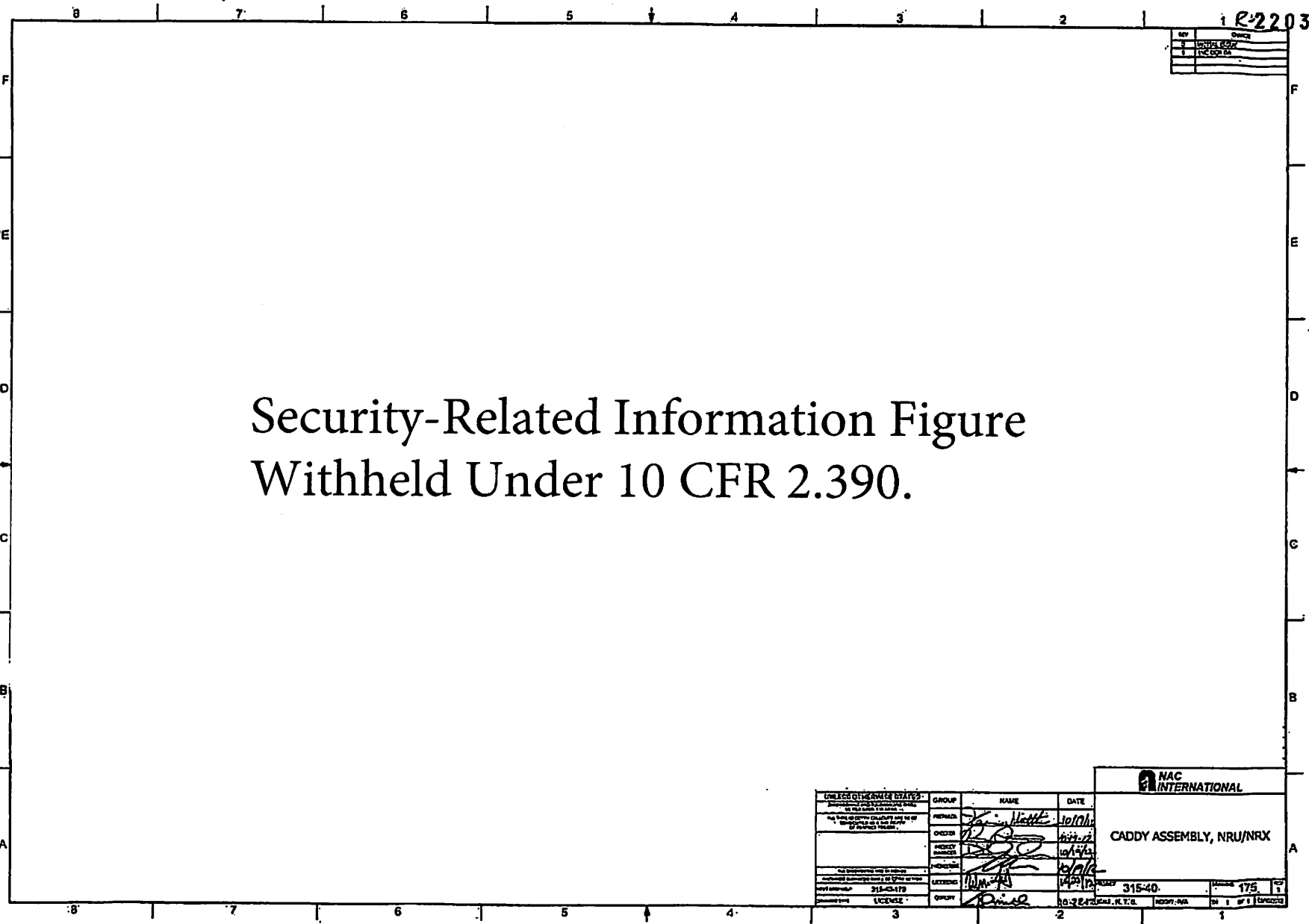
Attachment:

Attachment 1 – License Drawing 315-40-175, Rev. 1

cc. Tammy Hobbes – CNL  
cc. Mark Chapman – CNL  
cc. Rajesh Garg – CNSC

**Attachment 1**  
License Drawing 315-40-175, Rev. 1

ED20150155



Security-Related Information Figure  
 Withheld Under 10 CFR 2.390.

R-220304

REV	DATE
1	10/24/08
2	11/14/08
3	12/16/08
4	
5	

<b>CADDY ASSEMBLY, NRU/NRX</b>			
UNLICENSED MEMBER STATES <small>Unauthorized use, disclosure, or release of this data is prohibited.</small>	GROUP <small>Has this group category and all of its members met the criteria of licensed status?</small>	NAME <i>W. H. ...</i>	DATE <i>10/17/08</i>
	MEMBER <small>Has this member met the criteria of licensed status?</small>	<i>W. H. ...</i>	<i>10/17/08</i>
	MEMBER <small>Has this member met the criteria of licensed status?</small>	<i>W. H. ...</i>	<i>10/17/08</i>
	MEMBER <small>Has this member met the criteria of licensed status?</small>	<i>W. H. ...</i>	<i>10/17/08</i>
UNIT NUMBER: 315-4179 LICENSE:	GROUP:	UNIT: 315-40	MEMBER: 175 OF: 1